User manual of super-intelligent wind and solar hybrid controller

Suitable for 300W，400W 12/24V Wind turbines

Product model：T1-WSII-04-NNHN-2

T2-WSII-04-NNHN-2

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1 . Comprehensive introduction of products

1-1 Basic information

Super-intelligent wind/solar hybrid controller is a new type of special high performance control device for new energy application which is designed on the basis of ultra high performance controller. It contains many years of application experience (such as waterproof, dustproof, salt spray, wiring error, wind resistance limit control of Wind turbines, energy management etc.), it has done to ultimate no matter it applied to the charging control or street light control. In order to meet variety of applications, the controller adopts a hierarchical and modular structure, all functions can be achieved with different functional plates according to actual application, and it is convenient for rapid customization and application.

1-2 Characteristics

- **Waterproof**

Three defenses for circuit board, hierarchical design, even if small amount water enters, it will not damage the device

- **RS232 communication**

Standard configuration RS232 communication, it is easy to do the monitoring with the computer software. (RS485, short-range wireless is optional). Using a USB to RS232 members, more convenient to exchange data with a computer (computer with USB interface can be used).

- **Safety wire connecting**

Terminals are treated with injection molding process, wiring short circuit and cross will not occur, more safety for customers' operating.

- **Automatically alarming of battery reverse**

Battery input terminal will not be damaged with continuous reverse, and it has buzzer alarm. Avoid equipment damage and fire caused by wiring errors, and better protect the battery.

- **Automatically alarming of Photovoltaic panels reverse**

Photovoltaic panels will not be damaged with continuous reverse, and it has buzzer alarm. It will not cause wiring errors especially when work at night. (Note: reverse connection detection in the night needs manually keys intervention)

- **Continuous short-circuit output protection**

Discharge output terminal has continuous short-circuit protection, and over current protection. It is recovered after the abnormal excluded. Avoid damage of the controller or fire caused by electrical equipment fault (especially the short circuit).

- **Patented Wind turbines steady speed generation control technology**

Patented Wind turbines steady speed generation control method, which makes the Wind turbines not run with super speed, the Wind turbines can keep generation with a limited set speed even in the high winds, avoid direct stop of Wind turbines with over speed caused by strong wind. Greatly improve the Wind turbines generation energy and keep the safe running of the Wind turbines.

- **Patented Wind turbines stall current limit control technology**

Patented Wind turbines stall current limit control methods, which makes Wind turbines not run over current, avoid the damage of expensive generator caused by heating due to over current.

- **Wind turbines input MPPT generation technology (boost)**

Controller can provide automatically Wind turbines input maximum power tracking mode or the 5 segments match curve input configuration mode(input rev to input current; or output v to input current curve), which makes the high efficient generation of the Wind turbines, bu low speed.

- **Support multiple output mode selection**

This controller provides optional multiple output modes (light control, time c

light on in the morning, PWM dimming, reverse direction), which can satisfy a variety of applications.

❖ **Statistics the cumulative generating capacity, remaining power, speed, current, temperature and other data**

The controller screen displays not only the current, voltage, power of conventional Wind turbines, PV, battery, and the output terminal; but also the cumulative generating capacity of Wind turbines and PV, the remaining battery power, Wind turbines speed, unloading current, and the temperature of controller.

❖ **Alarm function when terminals up**

When the terminals are up, the controller will alarm, which requires customers to use with the correct install direction, avoid the possibility of damage caused by water comes into the controller when used in the open air or due to bad weather.

2.Product Parameter

Model	T2-WSII-04-NNHN-2	T1-WSII-04-NNHN-2
Battery parameters		
Applied battery voltage	24V	12V
Battery protect method	Reverse connection protection (do not burn any components, with voice prompt); over voltage protection, under voltage protection (for street light and such kind of load)	
Voltage at the over voltage protection point	29.0V±0.2V	14.5V±0.2V
Voltage at the over voltage recovery point	27.5V±0.2V	13.7V±0.2V
Voltage at the under voltage protection point	21.0V±0.2V	10.5V±0.2V
Voltage at the under voltage recovery point	23.0V±0.2V	11.5V±0.2V
Battery temperature compensation	5mv/℃/2V (settable) (optional component)	
Wind turbines input parameters		
Rated power of applied Wind turbines	400W/24V	400W/12V
Rated power of the terminal	17A dc (after rectification)	25A
Max. input current of the terminal	20A dc (after rectification)	35A
The default speed of the Wind turbines generation with limited speed	500 Rpm (settable)	
The default current of the Wind turbines generation with limited current	17A(settable)	25A (settable)
Wind turbines protection method	over rev protection, over current protection, induction lightening protection	
Unloading method	PWM stepless high-frequency soft unloading (built-in)	
MPPT function	Boost MPPT model (automatic tracking or 5 segments curve tracking)	
Input current of MPPT channel	12A	
PV input parameters		
Rated input current of applied PV	550W/24V（standard） 1100W/24V（ptional）	250W/12V（standard） 550W/12V（ptional）
Rated input current of terminal	15A（standard） 30A（optional）	
Charging voltage drop	<0.2V	
PV protection methods	Reverse connection protection (voice prompt)	
Unloading method	Open circuit unloading	
Discharge the output port parameters		
output	2 outputs	

Current of each output	12A
Output protection methods	Over current protection (15A/30sec. 18A/0.4sec.), short-circuit protection (current > 150A)
Output control methods	light control, time control, reverse output, PWM output (250HZ, only the 2nd output has it)
Others	
Auxiliary function	Monitor of air temperature inside controller, temperature of unloading parts and Wind turbines MPPT components, and also the monitor of control terminals installed on the inversion (with voice prompt)
Display mode	Liquid crystal (LCD) display
Communication mode	RS232(5V electrical level)/RS485 (standard) Short-range wireless (optional)
Displayed parameters	Wind turbines input voltage/current/power/generated energy/rev/unloading current PV input voltage/current/power/generated energy Battery voltage/charging current/power/total charging capacity/battery status information output current/power/abnormal information of the 2nd output port
Power consumption in standby mode(screen backlight closed)	About 20ma /24V system
Operating mode	3M foil key operation (4 keys)
Working temperature / humidity range (environment)	-40~+80℃/20~85%RH（non condensing）
Protection grade	IP41
Controller size (L*W*H)	175mm*148mm *84mm
Net weight	1.8KG

3. Installation and use

3-1 Installation attention

⚠ Please read this manual carefully before installation.

⚠ Installation should be operated by professional and technical personnel.

⚠ Before installation and maintenance, be sure the controller is uncharged and in the security state.

⚠ Please install the controller at a dry and ventilated place without dust, and avoid rainwater infiltration and direct sunlight.

⚠ When install the cabinet inside, leave enough space around the controller or radiating through box.

⚠ Keep away from corrosive gases and strong electromagnetic interference.

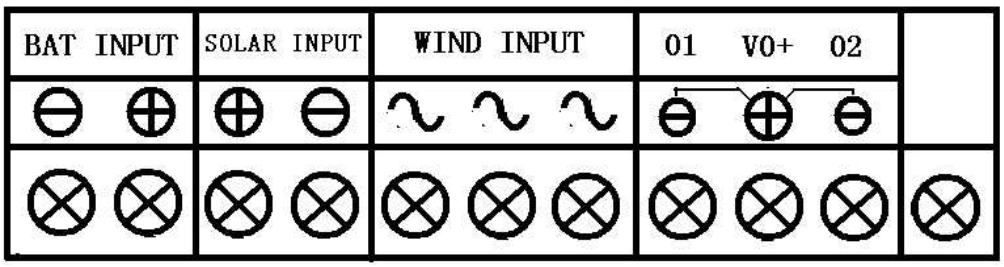
⚠ Installation area should be convenient for installation, electrical connection and later maintenance.

3-2 Installation steps

1. Select the installation area (please read the 'Installation notice' carefully).
2. Check and clean the installation area, and leave enough space for wiring.
3. Prepare the installation tools.
4. Fix the controller at the installation place.
5. Check and be sure the controller is installed firmly.

3-3 Electrical connection

3-3-1 Description of external connection port

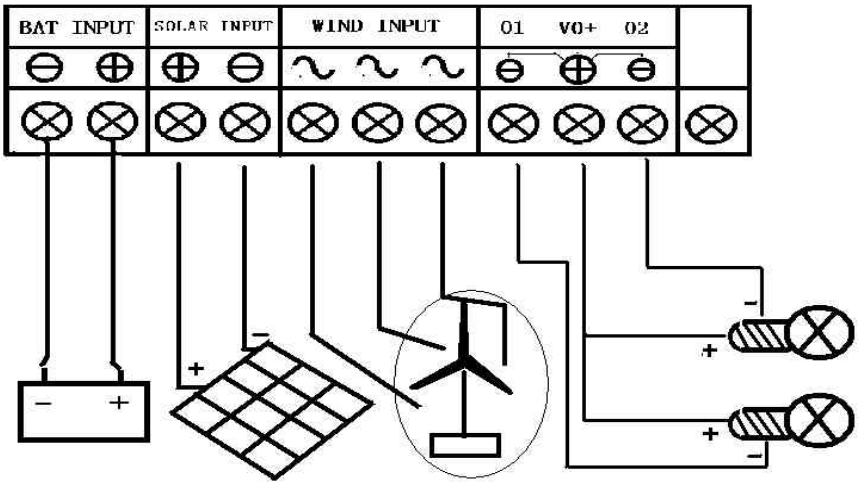


[**SOLAR INPUT**]-----Input terminal of solar panel, pay attention to the wiring polarity
[**BAT INPUT**]------Input terminal of battery, which is applicable to the 24V level battery, pay attention to the wiring polarity
[**WIND INPUT**]-----AC input terminal of the Wind turbines, non-polarity input
[**VO+ O1**] --------The 1st output terminal. VO+ connects with load positive; O1 connects with load negative
[**VO+ O2**] -------The 2nd output terminal. VO+ connects with load positive; O2 connects with load negative

⚠ **Attention: suggest doing wiring according to below order**

1. **First connect with output load (VO+ 01or VO+ 02)**
2. **Then connect with battery**
3. **And then connect with solar panel**
4. **At last connect with Wind turbines-driven generator**

Connecting diagram



3-3-2 Wiring attention

⚠Any incorrect operation during the wiring will cause danger, so the wiring operation must be implemented by professionals.

⚠ Please choose the right size, and good insulation cables for electrical connection

⚠Make sure the connectors are tighten during the wiring, no virtual connection

⚠ Avoid loose of connector caused by the shaking of wires during the movable use.

4 Parameters setting instructions

4-1 Key Function

The controller can cooperate with the system to work properly by setting the appropriate parameters. Accordingly, the controller can monitor and display the set parameters, or dynamic input and output data; it's easy for debugging and maintenance.

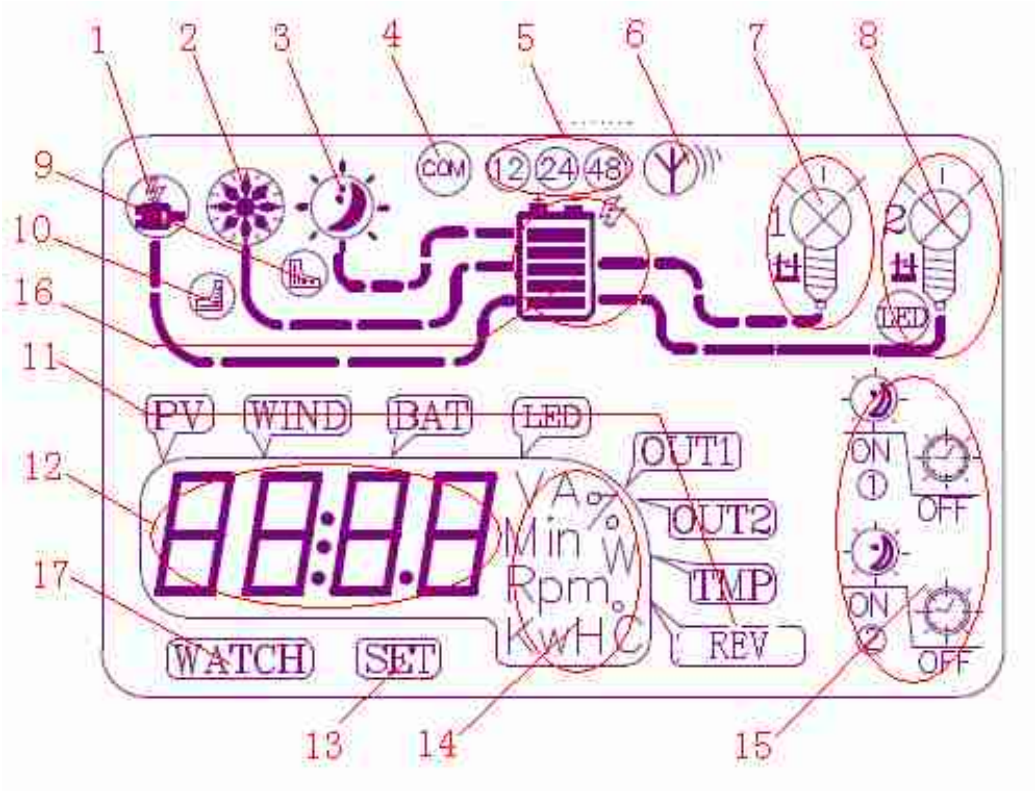
The controller enters into the work standby status ([RUN] words flashing) as soon as it powered and initialized. The controller displays different information according to the differen function types, the specific kind to prevail.

There are 4 operation buttons on the panel

Button	Function description
▲	Page up
▼	Page down
Esc	Escape
Enter	Confirm / Enter

4-2 LCD screen display

LCD screen can display the following information:



1. Mains electricity supply, displayed when mains electricity exits
2. Wind turbines graph, the graph rotates when the rotate; when brakes, displays brakes box
3. Daytime, night indication symbol. In the daytime displays sun, at night displays moon.
4. Communication display symbol, temporarily retained
5. Battery voltage level symbol, 12V displays 12; 24V displays 24; 48V displays 48
6. Wireless communication display, displays the symbol when has wireless module, displays dynamic symbol during communication
7. The No.1 output status display, when close the output, the symbol not light, otherwise, the symbol light. When short circuit, short circuit symbol displays; when has morning lighting function, and in the state of waiting for morning lighting, light symbol flashing indicates waiting.
8. The No.2 output status display, when close the output, the symbol not light, otherwise, the symbol lig short circuit, short circuit or over loading and such abnormalities, abnormal symbol displays; when has lighting function, and in the state of waiting for morning lighting, light symbol flashing indicates w normal output). If used LED driver module output, then LED symbol displays
9. Solar MPPT symbol, displays when has solar MPPT components, the symbol flashing when the MPPT w
10. Wind turbines MPPT symbol, displays when has Wind turbines MPPT components, the symbol flashing

MPPT works

11. PV parameter symbol
    Wind turbines parameter symbol
    Battery parameter symbol
    LED drive output parameter symbol
    No.1 output parameter symbol
    No.2 output parameter symbol
    Temperature symbol
    Rev symbol
12. Digital display parameter / status symbol
13. Parameter setting symbol
14. Parameter unit
15. No. 1/2 output/ close status display symbol, displays when has output module, ON corresponding to output open status, OFF to the close status
16. Battery status symbol, displays the rest battery power, after over voltage, displays the over voltage symbol
17. Data checking symbol

4-3 Browsing of input and output parameters

In the standby screen, press the [ENTER] button, the screen displays the word "WATCH", and press [ENTER] again, first displays the words "PV", which means can check the PV input parameters, in this state, press the page up or down buttons, can switch to other dynamic parameters, corresponding to "PV", "WIND ", " BAT", "OUT1", "OUT2", "TMP", "REV." After selecting the information need to be displayed, press [ENTER], you can enter the parameters class to be displayed currently, each parameter class following several subproject parameters, they can be displayed through up / down buttons. Any time after shows subprojects parameter class, press the [ENTER] can skip to the next parameter class. Any time press [ESC] can exit the parameter display step by step until you return to the standby screen.

For example (in the standby screen)

standby screen press [ENTER] press [ENTER] press [ENTER]

Below shows all the displayed parameters:

PV------ PV input parameters

S-U--------Solar input voltage (1 decimal point) Unit: V
S-I---------Solar input current (1 decimal point) Unit: A
S-P--------- Solar input power (no decimal point) Unit: W
S-d---------Solar input generated energy (no decimal point) Unit: Kw
E-U--------Analog voltage of external photosensitive resistor (1 decimal point) U
(Use external photosensitive resistor to do day/night checking instead o
panel)

WIND----- Wind turbines input parameters

n-U-------- Wind turbines input voltage (DC voltage after rectification) (1 decimal point) Unit: V

n-I---------Wind turbines input current (DC current after rectification) (1 decimal point) Unit: A

n-P-------- Wind turbines input power (DC power after rectification) (no decimal point) Unit: W

n-d-------- Wind turbines input generated energy (DC generated energy after rectification) (no decimal point) Unit: Kwh

n-F---------Wind turbines input unloading current (DC) (1 decimal point) Unit: A

n-C---------Current of Wind turbines charging to battery (1 decimal point) Unit: A

BAT------- Battery charging parameters

b-U---------Battery voltage (1 decimal point) Unit: V

b-I----------Total charging current to battery (1 decimal point) Unit: A

b-P----------Total charging power to battery (no decimal point) Unit: W

b-d--------- Total charging capacity to battery (no decimal point) Unit: Kwh

OUT1----- The 1st output parameters

O1I----------The 1st output current (1 decimal point) Unit: A

O1P----------The 1st output power (no decimal point) Unit: W

O1T----------The 1st output time (no decimal point) Unit: Min

OUT2----- The 2nd output parameters

O2I----------The 2nd output current (1 decimal point) Unit: A

O2P----------The 2nd output power (no decimal point) Unit: W

O2T----------The 2nd output time (no decimal point) Unit: Min

TMP------- Controller internal temperature display

TNP-------Controller internal temperature (no decimal point) Unit: ℃

REV-------- Wind turbines rev parameter

NSP------Wind turbines rev display (no decimal point) Unit: Rpm

4-4 Working parameters setting

The controller can set part of the key parameters through LCD screen. However, some advanced parameters can be set by the extra USB monitoring communication data cable.

In standby state, press the [ENTER], then through the up/down buttons to select [SET], press the [ENTER] again, the controller will be prompted for a password, enter the correct password and press the [ENTER], then you can enter the menu. The default password is: 0000

The Key Operating Instructions:

Enter the menu password input interface, the bit flashes, and every time press Page Down, flashing skip to the next operation bit; every time press Page Up, changes in operating-bit data (+1). After you enter the correct password, you will be prompted to "YES" and then enter into the menu parameter selection area. If wrong, prompts “ERR". Through page up and down to select the current menu. In the current menu, press "ENTER" to enter into the corresponding parameter setting interface immediately displays the actual setting of parameters. Modify the parameters as above describ modifying the parameters, press the "OK" to save the parameter setting immedia prompt "ERR" if there is an error, no error prompts "YES". Any time, pressing "E exit. Return to the previous level.

The controller can display all the setup parameters are as follows:

【Add】【OEY】【SYS】【t1O】【t1F】【t2O】【t2F】【ndS】

【nUt】【bEn】【nbI】【CLU】【SrU】【nnI】【nnS】

【OEY】----Enter the password configuration of parameter settings

Description: Through setting of this parameter, every time when you enter the menu to set the parameters, you need to enter the correct password (same with this parameter data) to perform menu operations, default value [000]

【SYS】----Select 24V system / 12V system / 48V system or automatic recognition settings

Description: Select 24V system [000], controller works under the configuration of 24V level.
Select the 12V system [001], controller works under the configuration of 12V level
Select the 24V systems [002], controller works under the configuration of 48V level
Select automatic system [003], controller works under the configuration of automatic voltage recognition.
Default: [000]

【T1O】【T1F】---These two parameters are combined for controlling the output: the 1st output method.

Description:

【T1O】=0 【T1F】=0 range 0-16 hours

ΔOutput in the night: (through LCD screen, only this mode c an be set)
The 1st output is light control output mode: that means output after dark; closed after dawn.
ΔOutput in the day: (through USD data wire and software to set this mode)
The 1st output is light control output mode: that means output after dawn; closed after dark.

【T1O】>0 【T1F】=0 range 0-16 hours

ΔOutput in the night: (through LCD screen, only this mode c an be set)
The 1st output is time control output mode: output at night, closed when the set time arrived. If the setting time has not arrived, but already in the daytime, output will be closed.
ΔOutput in the day: (through USD data wire and software to set this mode)
The 1st output is time control output mode: output in the day time, and closed when the set time arrived. If the setting time has not arrived, but already in the night, close the output in advance.

【T1O】=0 【T1F】>0 range 0-16 hours

ΔOutput in the night and output in the day are all valid
The 1st output maintains continuous output mode: that means maintain a continuo

output for 24 hours unless there is abnormality occurs (under voltage, over current, short circuit, etc.)

【T1O】>0　【T1F】>0　range 0-16 hours

Δ Output in the night: (through LCD screen, only this mode c an be set)

The1st output is morning lighting mode output: that means, after dark, output opens; close output when last time reaches to [T10] setting time, and transfer to a waiting state, waiting till to the [T1F] setting time, continue to open the output, until to the morning

Δ Output in the day: (through USD data wire and software to set this mode)

The1st output is morning lighting mode output: that means, after dawn, output opens; close output when last time reaches to [T10] setting time, and transfer to a waiting state, waiting till to the [T1F] setting time, continue to open the output, until to the dark.

【T2O】【T2F】---These two parameters are combined for controlling the output: the 2nd output method

【T2O】=0　【T2F】=0　range 0-16 hours

Δ Output in the night: (through LCD screen, only this mode c an be set)

The 1st output is light control output mode: that means output after dark; closed after dawn.

Δ Output in the day: (through USD data wire and software to set this mode)

The 1st output is light control output mode: that means output after dawn; closed after dark

【T2O】>0　【T2F】=0　range 0-16 hours

Δ Output in the night: (through LCD screen, only this mode c an be set)

The 1st output is time control output mode: output at night, closed when the set time arrived. If the setting time has not arrived, but already in the daytime, output will be closed.

Δ Output in the day: (through USD data wire and software to set this mode)

The 1st output is time control output mode: output in the day time, and closed when the set time arrived. If the setting time has not arrived, but already in the night, close the output in advance.

【T2O】=0　【T2F】>0　range 0-16 hours

Δ Output in the night and output in the day are all valid

The 1st output maintains continuous output mode: that means maintain a continuous output for 24 hours unless there is abnormality occurs (under voltage, over current. short circuit, etc.)

【T2O】>0　【T2F】>0　range 0-16 hours

Δ Output in the night: (through LCD screen, only this mode c an be set)

The1st output is morning lighting mode output: that means, after dark, output opens; close output when last time reaches to [T20] setting time, and transfer to a waiting state, waiting till to the [T2F] setting time, continue to open the output, until to the morning

Δ Output in the day: (through USD data wire and software to set this mode)

The1st output is morning lighting mode output: that means, after dawn, output opens; close output when last time reaches to [T20] setting time, and transfer to a waiting state, waiting till to the [T2F] setting time, continue to open the output, until to the dark.

Δ In addition, the 2nd output can output PWM signal, does not rely on the [T2O] [T2F] parameters, this function can be achieved through the mode set by software through USB data wire.

When set to PWM output mode, it will output PWM signal

PWM signal frequency： 250HZ ±5HZ

PWM signal amplitude： Battery voltage

PWM output current： 12A(low level is valid)

This output mode mainly used for the LED lamp dimming, cooperate with our energy management algorithm (need to use the monitoring software Settings) to realize the output energy management, achieve more bright Light time.

【NDS】------ Pole pair number set of the wind generator, used for measuring the Wind turbines speed

Generally, wind generators are permanent magnet synchronous generator, how many magnets inside; half is the number of pole pairs, for example, if there are 8 magnets, the number of pole pairs is 4.

Range: 2-100 default: 4 pairs

【NUT】-----Sustained braking time parameter set after Wind turbines braking,

After the Wind turbines brakes, Wind turbines can be released after the brake time set by this parameter, and continue to generate electricity (except: after Wind turbines brakes, if the brake current is too large, and do not reduce even last for some time, the controller will release the braking action, and recheck brake conditions after a period of time, if OK, re-brake, again and again, to avoid burn generator or controller due to large current, limited current set by [NNI] parameters)

Range: 1-59 default: 20 minutes

【BEN】----The buzzer sound enabled settings

When this parameter is set to [001], enable buzzer alarm

Following states will cause the buzzer ring:

1， A key input

2， The battery reversed

3， PV panels reversed

4， The temperature is too high

5， The 1st output is short circuit, over current

6， The 2nd output is short circuit, over current

7， The controller terminals is upward

【NBI】-------Wind turbines MPPT charging components maximum input current limit setting

1-In the automatic power tracking mode (only can be set by USB data wire)

This parameter is used to control the input current through the MPPT parts; and on the other hand, control the matching of Wind turbines input impedance, if the value is set too small, the MPPT algorithm is inefficient, but does not pin down the Wind turbines; If it is set too large, the MPPT algorithm is high efficient, but may be drag Wind turbines in low wind speed. So they need a reasonable set according to Wind turbines power curve.

For example, in the low wind speed (such as 4.5 m/s), the Wind turbines can output the maximum power under 2A current, and will not cause the stall run of Wind turbines (pin down the Wind turbines, speed can not be improved), then this parameter should be set to 2A, that is [NBI] = 20, there is a decimal point: 2.0A

Range 0-50 or 0-5A current. Specific depend on the maximum power configuration of MPPT module.

2- 5In the 5 segments matching mode (only can be set by USB data wire)

Through USB data wire to set the 5 points Wind turbines curve of rev-current, or voltage-current, the set current will be limited by the [NBI] parameter. As the controller includes the main charging passage of the Wind turbines, MPPT low voltage charging passage, so this parameter restricts the maximum input current of MPPT low voltage charging, can avoid over current running of MPPT low voltage boost charging passage.

After set running in the curve matching, the controller will extract the input current from the Wind turbines to charge the battery according to this charging curve. Generally, recommend the experienced customers use this mode to match with the Wind turbines, to have the best generating effect.

【SrU】-------Starting voltage setting of MPPT charging input carried out by Wind turbines

When the input voltage of Wind turbines is over this setting parameter, MPPT start charging, the controller does the maximum power tracking to Wind turbines i automatically (o 5 segments curve matching)

【CLU】-------Input voltage setting corresponding to close the Wind turbines charging

When the input voltage of Wind turbines is lower than setting parameter, close the charging to MPPT, can avoid stopping of Wind turbines under a very low speed.

【NNI】------ Wind turbines maximum input current setting

Wind turbines input current for generating exceeds the current set by this parameter, will cause a controlled braking action, combining [NUT] parameter, and finish the brake control.
Range 0-500, which is 0-50.0A default 18.0A

【NNS】----- Wind turbines maximum rev limit setting

When the Wind turbines speed reaches the speed set by this parameter, the controller controls the speed within this parameter setting value through unloading automatically, stable the maximum speed, if the Wind turbines speed is too large, exceeds the automatic steady speed range, continue for some time, will start braking, braking time decided by [NUT].
Range 0-3000 rev / min default 500

【Add】----- Communication code of the controller

Give a code to different device during the multiple communications; every controller code must be different with others, to avoid crosstalk.
Range 2 – 250 default 6

5. Special operations of controller

5-1 Manually unloading operation:

In standby mode (the controller displays 'RUN', and blinking), long press the [ESC] button for 3 seconds, the Wind turbines will enter into manual brake status immediately, the Wind turbines graphic symbol shows as a frame, and the Wind turbines is framed by it, which means it's braking now. If now you press [ESC] for 3 seconds, the braking action will be released slowly, and the Wind turbines generates again.

5-2 Controller warm reset start:

Press page up and down buttons simultaneously for 3 seconds, LCD digital part displ "RST", the controller is reset immediately, reinitialize working. The effect is the sam remove the power and then energized. Recommend to perform this operation to reset

controller after setting all the parameters, or encounter problems.

5-3 Manual testing of PV input reverse (for wiring in the night)

When connect the solar panel in the night, this function is used to detecting whether there is a reverse function (when wiring in the daytime, this function is failure)
In standby mode (the controller displays 'RUN', and blinking), long press the page up button for 3 seconds, the controller displays '-C-', continuously check if the solar panel is reversed. If reverse is exists, displays 'Err', recheck after correcting, if OK, no error information will appear.

5-4 Removing of abnormal information

Abnormal failure can be removed manually, and the method is: enter the menu, then exit, and the failure is clear.

Buzzer installed inside the controller, different voices express different meanings

Operation	Voice
The controller is powered on	One " Drip " sound
A key input (press the button)	One " Drip " sound per pressing
The battery reversed	Long "Drip" sound
PV panels reversed	Long "Drip" sound
The controller terminals is upward	Long "Drip" sound
The internal temperature is too high(>95 ℃)	Intermittent "Drip" sound
The 1st output is short circuit, over current	Intermittent "Drip" sound
The 2nd output is short circuit, over current	Intermittent "Drip" sound

6. Using of monitoring software (optional function)

⚠ Only can be used after buying monitoring software and USB communication data wire

6-1 Brief description

The controller can monitor and set parameters through LCD, and can also use computer monitoring software provided by our company to set or check the data information. Use monitoring software can provide more comprehensive regulatory measures.

Communications with computer contain TTL232 (standard configuration), 485 (optiona'' short-range wireless communications (optional, external module), specifically based on the pra application.

6-2 Software and USB driver installation

Supports WINDOWS XP/ WIN7/WIN8 WINDOWS VISTA systems

Below shows the process of using standard configuration interface (TTL232 interface)

6-2-1 Install the monitor software

Insert monitoring software CD enclosed with cable, run the Wind And Solar Hybrid Controller (). exe program, complete the software installation according to the prompt.

Wind And Solar Hybrid Controller() Setup
Welcome
Welcome to the installer for Wind And Solar Hybrid Controller() 1.0.
It is strongly recommended that you exit all Windows programs before continuing with this installation.
If you have any other programs running, please click Cancel, close the programs, and run this setup again.
Otherwise, click Next to continue.
< Back
Next >
Cancel
Installation Folder
Where would you like Wind And Solar Hybrid Controller() to be installed?
The software will be installed in the folder listed below. To select a different location, either type in a new path, or click Change to browse for an existing folder.
Install Wind And Solar Hybrid Controller() to:
C:\Program Files\Wind And Solar Hybrid Controller()
Change...
Space required: 2.59 MB
Space available on selected drive: 565.7 MB
Shortcut Folder
Where would you like the shortcuts to be installed?
The shortcut icons will be created in the folder indicated below. If you don't want to use the default folder, you can either type a new name, or select an existing folder from the list.
Shortcut Folder:
Wind And Solar Hybrid Controller()
Install shortcuts for current user only
Make shortcuts available to all users
Ready to Install
You are now ready to install Wind And Solar Hybrid Controller() 1.0
The installer now has enough information to install Wind And Solar Hybrid Controller() on your computer.
The following settings will be used:
Install folder: C:\Program Files\Wind And Solar Hybrid Controller()
Shortcut folder: Wind And Solar Hybrid Controller()
Please click Next to proceed with the installation.
Installing Wind And Solar Hybrid Controller()
Please wait...
Installing Files...
Seeking...
Installation Successful
The Wind And Solar Hybrid Controller() 1.0 installation is complete.
Thank you for choosing Wind And Solar Hybrid Controller()
Please click Finish to exit this installer.
Finish

After installation, below titles appeared on the desk

The left one is the driver program cabinet of USB data wire, right one is the shortcut of monitoring software.

Decompress the left driver package into a folder; the default location is the installation directory.

After decompression, you can see the following files in the installation directory.

6-2-2 Install the USB driver program

1---Plug the cable into the computer's USB port

2---The computer will find hardware and prompt to install the driver

And then choose “install from a list or specific location”, click Next

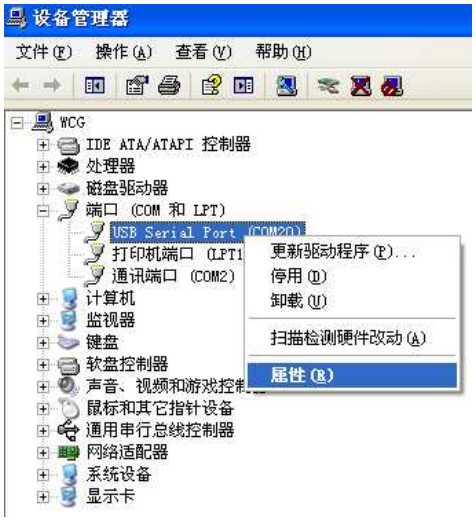
Then tick “Search contains this position”.
Click the “Browse", select File ‘DRIVE’
Click Next:
Begin to install the driver. After installation, the system will Re hardware.
Then repeat the above operation.
Till now, driver installation finishes.
Your computer will get a COM port

You can right- click on the "My Computer” to check in the Device Manager

The USB Serial Port (COM4) is the COM port

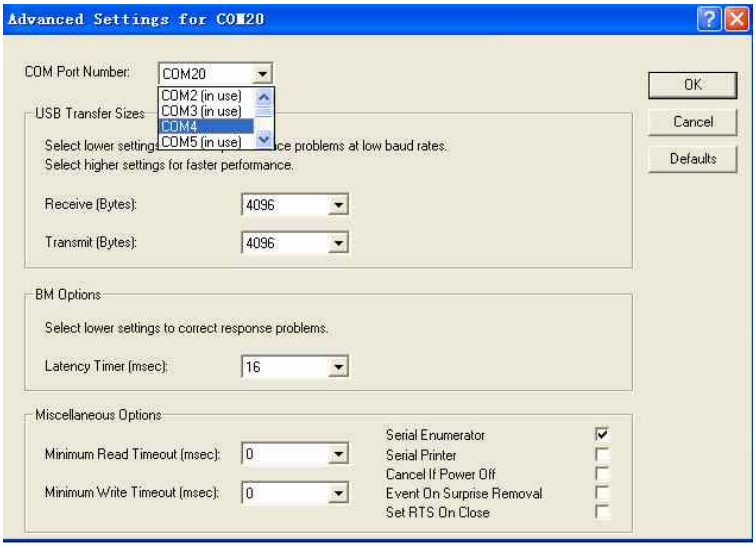
Attention: if the COM port is larger than 15, it can be used after manually changing of the port code (as the monitoring software only supports the code between COM1-COM15)

Solution is:
Open identify device manager according to above method,
Right-click the corresponding COM port;
Select “property” in the menu



Pop up the right Property window
Click “Port Setting”
And then click “Advanced...” button
Pop up the modifying window, as the right lower picture

Choose the COM port within 1-15 from the drop-down menu of “COM Port Number”, then click “OK”



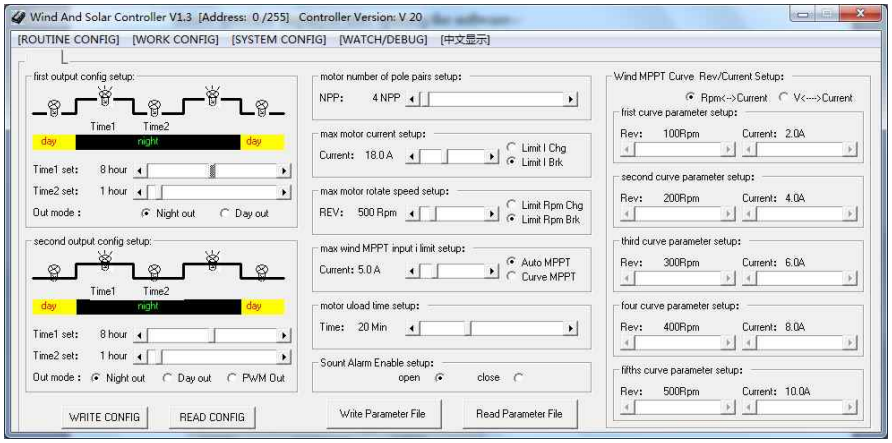
6-3 Using of software

6-3-1 Browsing of software

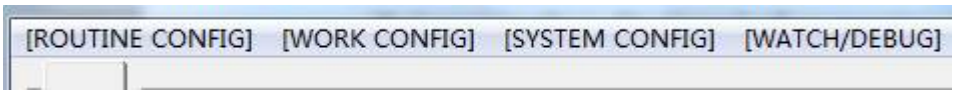
After the above steps finished, the software can be used for monitoring.
Executed in the following order

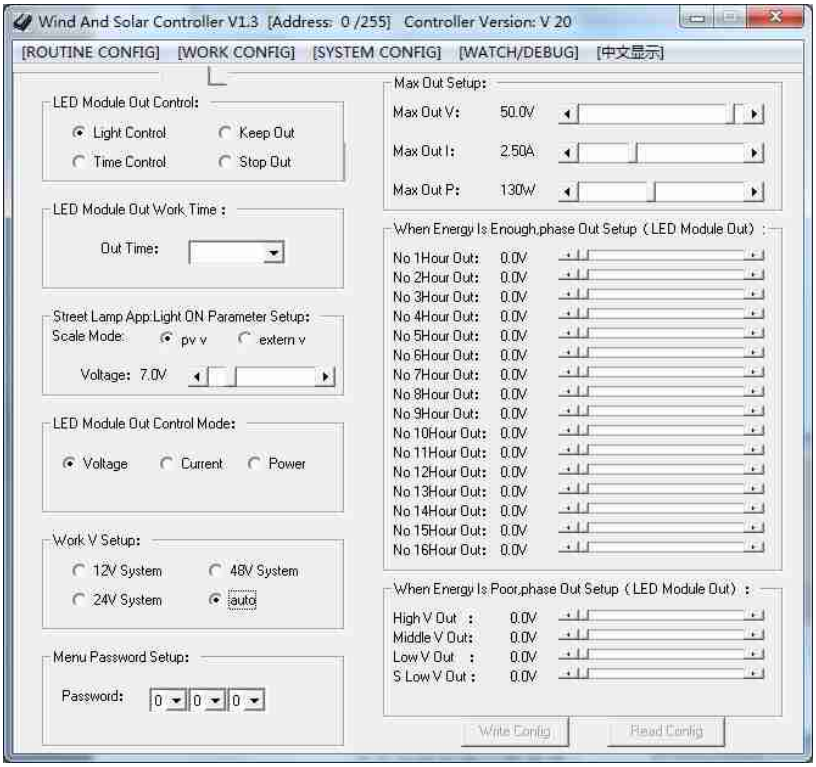
1- Provide 24V (12V) power, makes the controller work
2- Plug data wire into the USB port of computer, another side plugged into the DB9 port of the controller.
3- Open the monitoring software

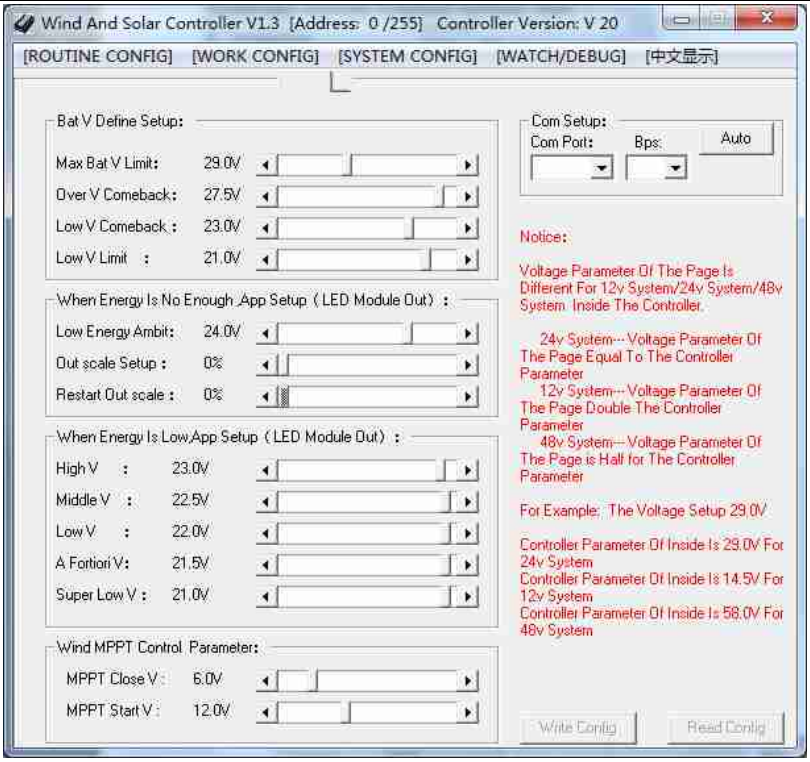
Below interface displayed after opening the software

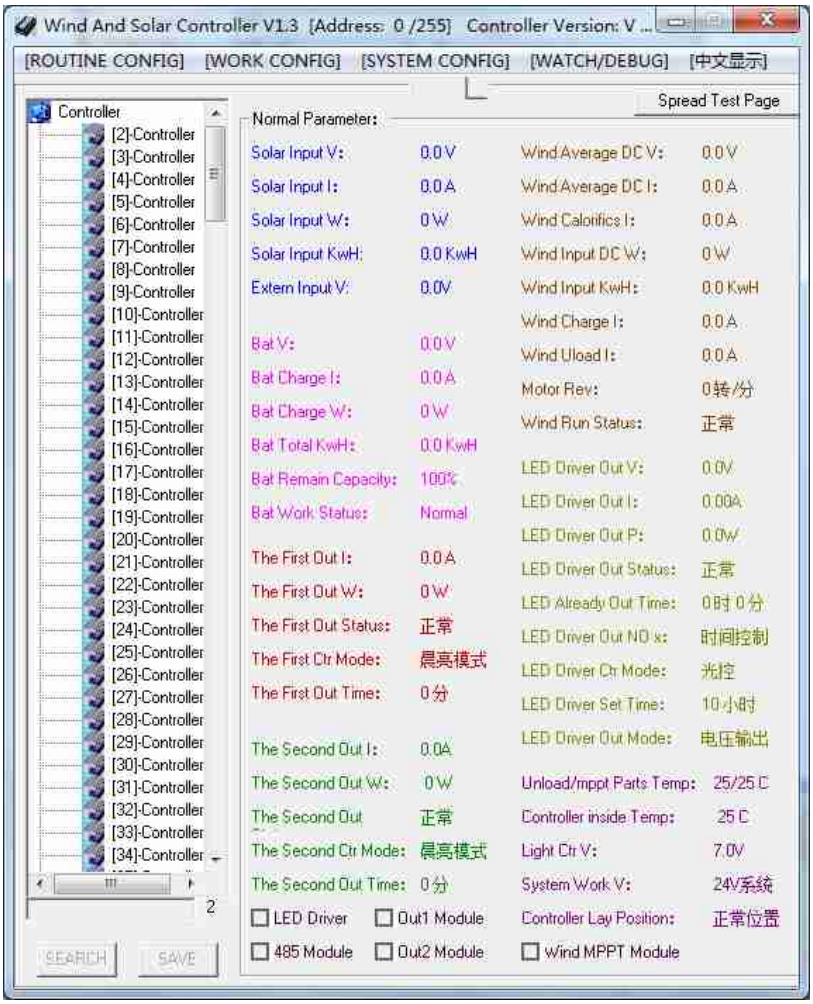

Wind And Solar Controller V1.3 [Address: 0 /255] Controller Version: V 20
[ROUTINE CONFIG] [WORK CONFIG] [SYSTEM CONFIG] [WATCH/DEBUG] [中文显示]
first output config setup:
Time1 Time2
day night day
Time1 set: 8 hour
Time2 set: 1 hour
Out mode : Night out Day out
second output config setup:
Time1 Time2
day night day
Time1 set: 8 hour
Time2 set: 1 hour
Out mode : Night out Day out PWM Out
motor number of pole pairs setup:
NPP: 4 NPP
max motor current setup:
Current: 18.0 A
Limit I Chg
Limit I Brk
max motor rotate speed setup:
REV: 500 Rpm
Limit Rpm Chg
Limit Rpm Brk
max wind MPPT input i limit setup:
Current: 5.0 A
Auto MPPT
Curve MPPT
motor uload time setup:
Time: 20 Min
Sount Alarm Enable setup:
open close
Wind MPPT Curve Rev/Current Setup:
Rpm<-->Current V<--->Current
frist curve parameter setup:
Rev: 100Rpm Current: 2.0A
second curve parameter setup:
Rev: 200Rpm Current: 4.0A
third curve parameter setup:
Rev: 300Rpm Current: 6.0A
four curve parameter setup:
Rev: 400Rpm Current: 8.0A
fifths curve parameter setup:
Rev: 500Rpm Current: 10.0A
WRITE CONFIG
READ CONFIG
Write Parameter File
Read Parameter File

Click below interface can be switched to a different page



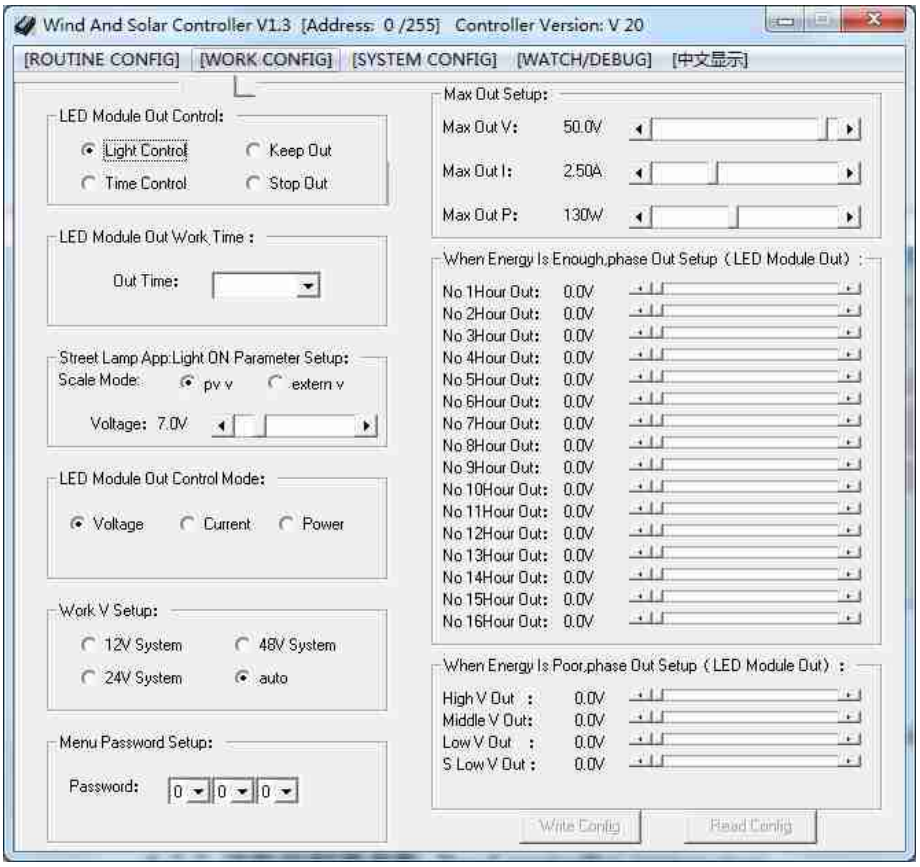

Wind And Solar Controller V1.3 [Address: 0 /255] Controller Version: V 20
[ROUTINE CONFIG] [WORK CONFIG] [SYSTEM CONFIG] [WATCH/DEBUG] [中文显示]
LED Module Out Control:
Light Control Keep Out
Time Control Stop Out
LED Module Out Work Time :
Out Time:
Street Lamp App:Light ON Parameter Setup:
Scale Mode: pv v extern v
Voltage: 7.0V
LED Module Out Control Mode:
Voltage Current Power
Work V Setup:
12V System 48V System
24V System auto
Menu Password Setup:
Password: 0 0 0
Max Out Setup:
Max Out V: 50.0V
Max Out I: 2.50A
Max Out P: 130W
When Energy Is Enough,phase Out Setup (LED Module Out) :
No 1Hour Out: 0.0V
No 2Hour Out: 0.0V
No 3Hour Out: 0.0V
No 4Hour Out: 0.0V
No 5Hour Out: 0.0V
No 6Hour Out: 0.0V
No 7Hour Out: 0.0V
No 8Hour Out: 0.0V
No 9Hour Out: 0.0V
No 10Hour Out: 0.0V
No 11Hour Out: 0.0V
No 12Hour Out: 0.0V
No 13Hour Out: 0.0V
No 14Hour Out: 0.0V
No 15Hour Out: 0.0V
No 16Hour Out: 0.0V
When Energy Is Poor,phase Out Setup (LED Module Out) :
High V Out : 0.0V
Middle V Out: 0.0V
Low V Out : 0.0V
S Low V Out : 0.0V
Write Config
Read Config


Wind And Solar Controller V1.3 [Address: 0 /255] Controller Version: V 20
[ROUTINE CONFIG] [WORK CONFIG] [SYSTEM CONFIG] [WATCH/DEBUG] [中文显示]
Bat V Define Setup:
Max Bat V Limit: 29.0V
Over V Comeback: 27.5V
Low V Comeback : 23.0V
Low V Limit : 21.0V
When Energy Is No Enough ,App Setup (LED Module Out) :
Low Energy Ambit: 24.0V
Out scale Setup : 0%
Restart Out scale : 0%
When Energy Is Low,App Setup (LED Module Out) :
High V : 23.0V
Middle V : 22.5V
Low V : 22.0V
A Fortiori V: 21.5V
Super Low V : 21.0V
Wind MPPT Control Parameter:
MPPT Close V : 6.0V
MPPT Start V : 12.0V
Com Setup:
Com Port:
Bps:
Auto
Notice:
Voltage Parameter Of The Page Is Different For 12v System/24v System/48v System Inside The Controller.
24v System--- Voltage Parameter Of The Page Equal To The Controller Parameter
12v System--- Voltage Parameter Of The Page Double The Controller Parameter
48v System--- Voltage Parameter Of The Page is Half for The Controller Parameter
For Example: The Voltage Setup 29.0V
Controller Parameter Of Inside Is 29.0V For 24v System
Controller Parameter Of Inside Is 14.5V For 12v System
Controller Parameter Of Inside Is 58.0V For 48v System
Write Config
Read Config


Wind And Solar Controller V1.3 [Address: 0 /255] Controller Version: V ...
[ROUTINE CONFIG] [WORK CONFIG] [SYSTEM CONFIG] [WATCH/DEBUG] [中文显示]
Spread Test Page
Controller
[2]-Controller
[3]-Controller
[4]-Controller
[5]-Controller
[6]-Controller
[7]-Controller
[8]-Controller
[9]-Controller
[10]-Controller
[11]-Controller
[12]-Controller
[13]-Controller
[14]-Controller
[15]-Controller
[16]-Controller
[17]-Controller
[18]-Controller
[19]-Controller
[20]-Controller
[21]-Controller
[22]-Controller
[23]-Controller
[24]-Controller
[25]-Controller
[26]-Controller
[27]-Controller
[28]-Controller
[29]-Controller
[30]-Controller
[31]-Controller
[32]-Controller
[33]-Controller
[34]-Controller
2
SEARCH
SAVE
Normal Parameter:
Solar Input V: 0.0 V
Solar Input I: 0.0 A
Solar Input W: 0 W
Solar Input KwH: 0.0 KwH
Extern Input V: 0.0V
Bat V: 0.0 V
Bat Charge I: 0.0 A
Bat Charge W: 0 W
Bat Total KwH: 0.0 KwH
Bat Remain Capacity: 100%
Bat Work Status: Normal
The First Out I: 0.0 A
The First Out W: 0 W
The First Out Status: 正常
The First Ctr Mode: 晨亮模式
The First Out Time: 0分
The Second Out I: 0.0A
The Second Out W: 0 W
The Second Out 正常
The Second Ctr Mode: 晨亮模式
The Second Out Time: 0分
LED Driver
Out1 Module
485 Module
Out2 Module
Wind Average DC V: 0.0 V
Wind Average DC I: 0.0 A
Wind Calorifics I: 0.0 A
Wind Input DC W: 0 W
Wind Input KwH: 0.0 KwH
Wind Charge I: 0.0 A
Wind Uload I: 0.0 A
Motor Rev: 0转/分
Wind Run Status: 正常
LED Driver Out V: 0.0V
LED Driver Out I: 0.00A
LED Driver Out P: 0.0W
LED Driver Out Status: 正常
LED Already Out Time: 0时 0分
LED Driver Out NO s: 时间控制
LED Driver Ctr Mode: 光控
LED Driver Set Time: 10小时
LED Driver Out Mode: 电压输出
Unload/mppt Parts Temp: 25/25 C
Controller inside Temp: 25 C
Light Ctr V: 7.0V
System Work V: 24V系统
Controller Lay Position: 正常位置
Wind MPPT Module

6-3-2 Connect the controller

Switch to the 3rd page, click auto configuration button, the monitoring software begins to connecting with the controller, if the connects, data will be filled in the “communication port” and “baud rate” automatically, finish the connection.



Once the connection is completed, the corresponding function is displayed, the associated function is not displayed.

6-3-3 Read controller parameters

There are [read configuration] and [write configuration] buttons on page 1-3. After connecting with the controller, the monitoring software can read the configuration of controller through this [read configuration], if every page is read, all the parameters of the controller will be displayed in the corresponding interface, which is easy for checking, analyzing and modifying.

6-3-4 Write controller parameters

There are [read configuration] and [write configuration] buttons on page 1-3. After connecting with the controller, write the parameters modified by monitoring sofl into the controller through this [write configuration], if every page is written in, the parameters of the monitoring software will be record in the controller.

Attention:

1- Parameters are not lost after losing power

2-When the parameters are written in, some of them are valid immediately; some of them will be valid after restart the controller. Recommend to restart the controller after all the configuration is finished, to make all the parameters be valid.

3-Recommend to read the internal parameters of the controller before modifying the parameters, then modify on this basis, and write in at last.

6-3-5 Backup of controller parameters

1- Please connect with controller before operation.

2-Before making the backup of controller parameters, first read the configuration on page 1-3 through the [read configuration], and save them in the monitoring software.

3-There is a button of [Backup parameter to file] on page 1, click this button, and select file path and setting file name (the filename suffix is .max), then click confirm, a parameter file is generated for later use.

6-3-6 Read and write the parameter of backup files

1- Please connect with controller before operation.

2-There is a button of [Read the backup parameter from file] on page 1, clicks this button to select parameter file, if the parameter file is correct (the parameter file matches with the hardware configuration of current controller. If the hardware of controller is different, the reading maybe failed), there will be prompting of successfully reading.

3-Write the parameters of 1-3 pages to the controller sequentially.

6-3-7 Check controller dynamic parameters

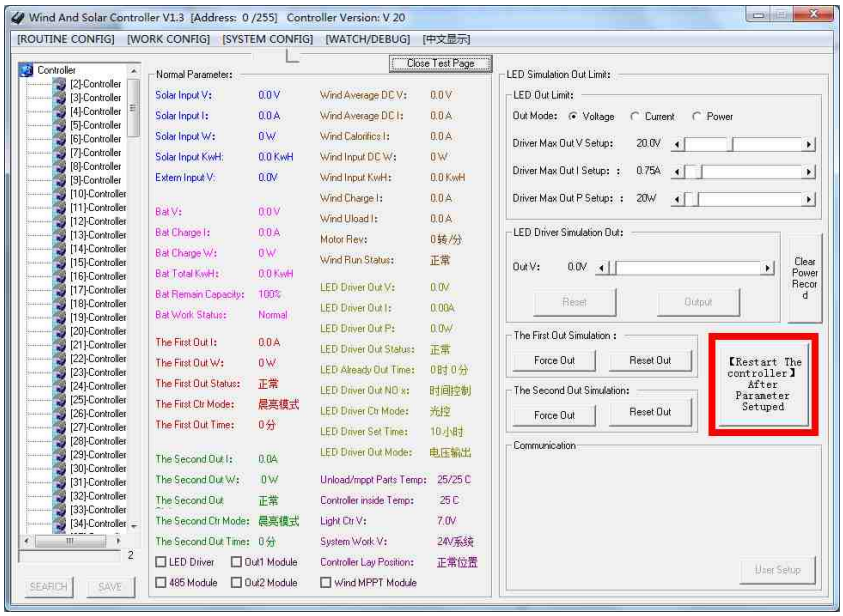
1- Please connect with controller before operation.

2-Switch to [Checking and debugging of parameters] on page 4, the param will be updated once per second, for dynamic checking, and all the real-generation data of controller can be checked.

6-3-8 Debugging of controller software

1- Please connect with controller before operation.

2-Switch to [Checking and debugging of parameters] on page 4, then clicks [Simulation testing interface] shows as below:



Do Analog output and closing operation to the 1st and 2nd output.

3-If the 2nd output is in the PWM output mode, there will be a debugging interface on the page as below shows:

which is used to simulate the PWM signal output, then there has corresponding PWM signal output at the output port.

6-3-9 Debugging of controller auxiliary functions

1- Please connect with controller before operation.

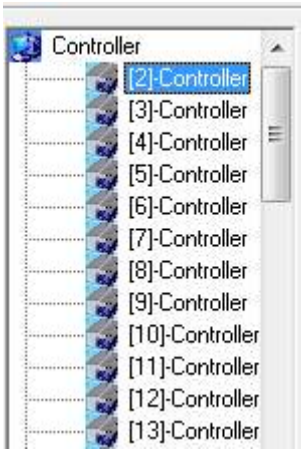
2-Click the button of [remove all the generated capacity record] on the extended page of page 4, to remove all the generated capacity record, and recover the generated capacity to 0

3-Click the button of [restart controller] on the extended page of page 4, to the controller, the effect is the same as remove the power and then energi recommend to click this button setting of parameters is finished, to restar controller to make the parameters valid.

4-Click the button of [User Setup] on the extended page of page 4, to active the controller code, describes the edition of information.

When the edition is finished, clicks [write configuration] to save it.

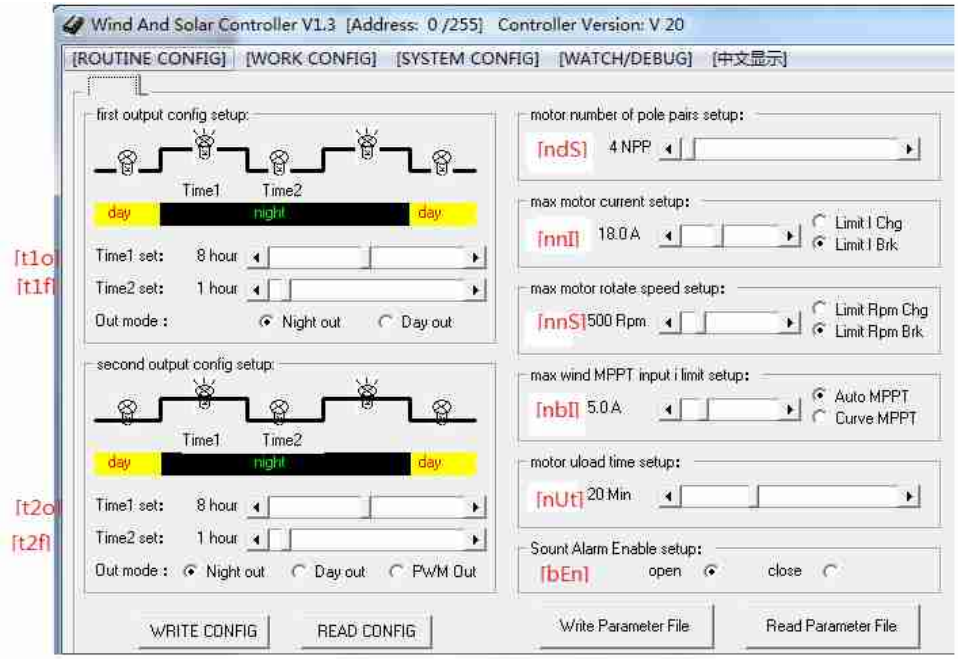
5-In multi- device monitoring status (if using RS485 communication), all controllers are attached to one RS485 communication line. Search the device on this line through clicking the [search] button on the lower left corner of page 4. The searched device will be listed. When the searching is completed, click [Save] button to save the device information, next time when you open the software, all the device information will be displayed. Click on the corresponding device, the monitoring, debugging, reading and writing data to this device will be started.



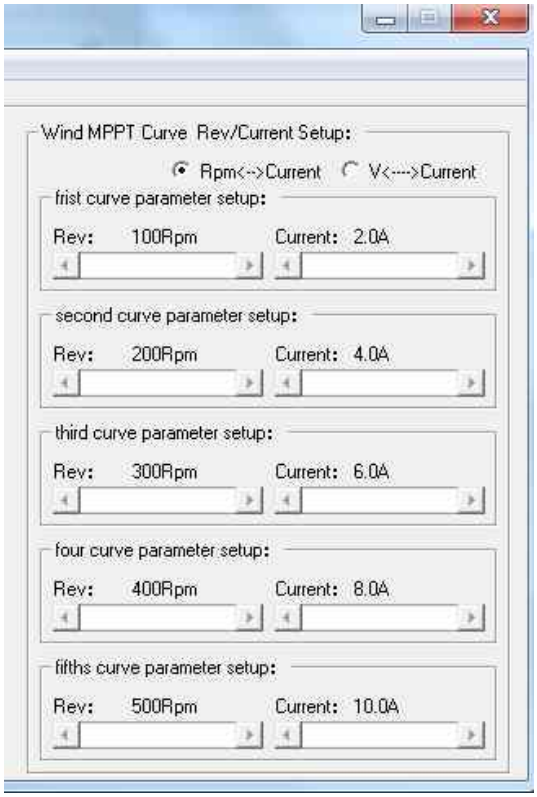
6-4 Description of monitoring software parameters

6-4-1 Description of parameters on page 1

After connecting the controller, effective parameters are displayed; all of them are necessary parameters. The qty of displayed parameters is more the set parameters on the LCD screen comes with the controller. Part of correspondence between them as follows:


Wind And Solar Controller V1.3 [Address: 0 /255] Controller Version: V 20
[ROUTINE CONFIG] [WORK CONFIG] [SYSTEM CONFIG] [WATCH/DEBUG] [中文显示]
first output config setup:
Time1 Time2
day night day
Time1 set: 8 hour
Time2 set: 1 hour
Out mode : Night out Day out
second output config setup:
Time1 Time2
day night day
Time1 set: 8 hour
Time2 set: 1 hour
Out mode : Night out Day out PWM Out
motor number of pole pairs setup:
[ndS] 4 NPP
max motor current setup:
[nnI] 18.0 A
Limit I Chg
Limit I Brk
max motor rotate speed setup:
[nnS] 500 Rpm
Limit Rpm Chg
Limit Rpm Brk
max wind MPPT input i limit setup:
[nbI] 5.0 A
Auto MPPT
Curve MPPT
motor uload time setup:
[nUt] 20 Min
Sount Alarm Enable setup:
[bEn] open close
WRITE CONFIG
READ CONFIG
Write Parameter File
Read Parameter File

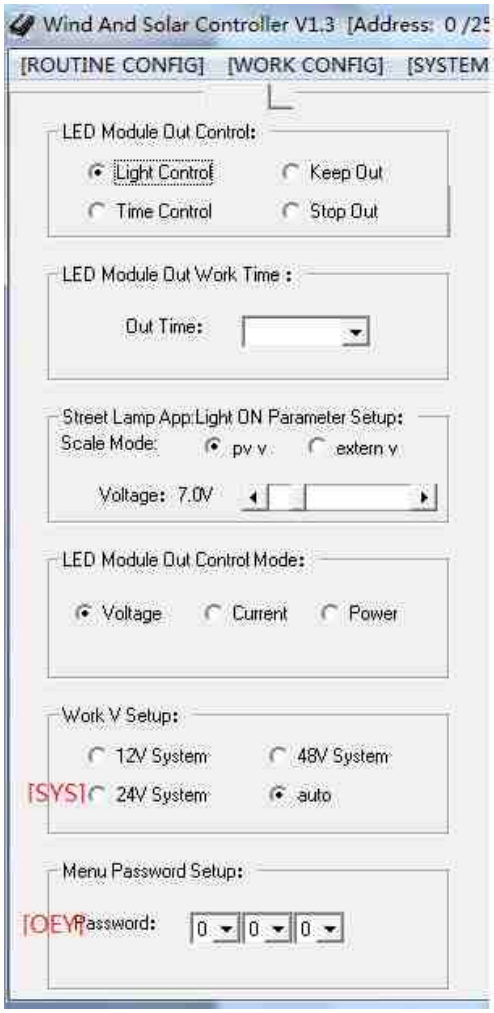
This page is used to set the configuration of Wind turbines MPPT 5 segments generation curve



A. Select Rev-Current modeIn this mode, 5 rev parameters and corresponding parameters can be set, used to matching with Wind turbines input curve.

B. Select Voltage-Current mode In this mode, 5 voltage parameters and corresponding parameters can be set, used to matching with Wind turbines input curve.

6-4-2 Description of parameters on page 2



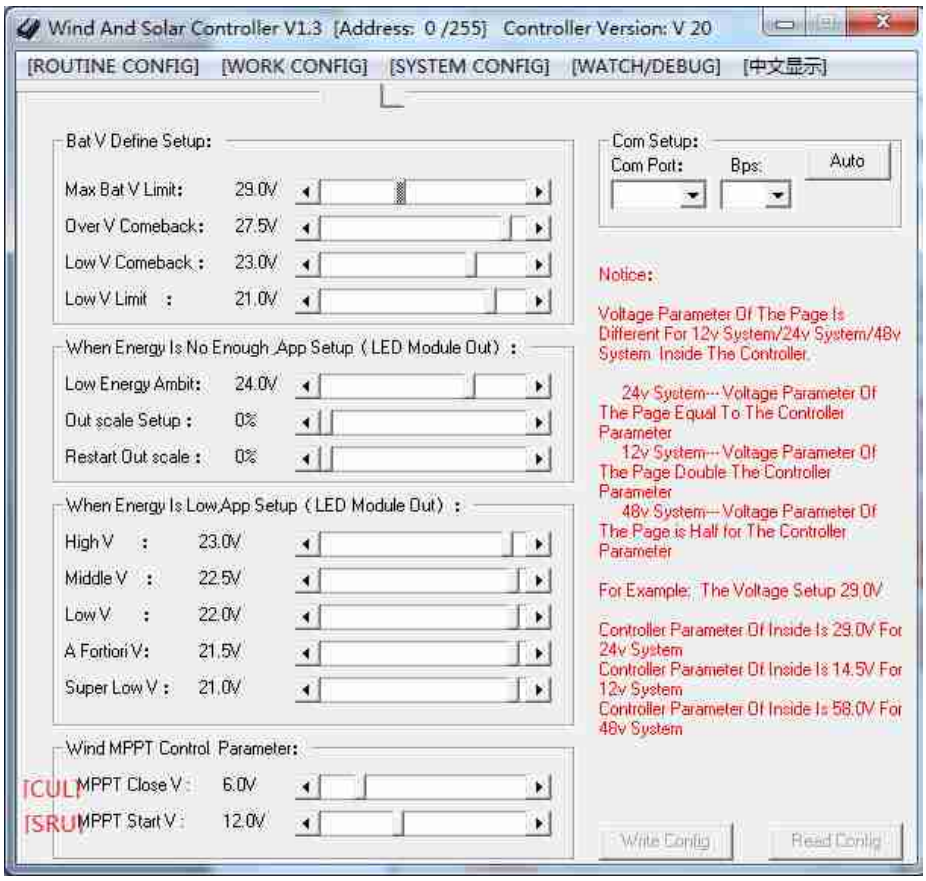
In which

This parameter is applied for street light output

1. Use PV panels as brightness perception sensor (PV panel)
   A. When the input voltage of solar panel is lower than the parameter value, starts output.
   B. When the input voltage of solar panel is higher than the parameter value + 2.5V, closes output.
2. Select photosensitive resistor as brightness perception sensor (photosensitive resistor)
   A. When the input voltage of photosensitive resistor is lower than the parameter value, starts output.
   B. When the input voltage of photosensitive resistor is higher than the parameter value + 2.5V, closes output.

initial value： 7.0V

6-4-3 Description of parameters on page 3


Wind And Solar Controller V1.3 [Address: 0 /255] Controller Version: V 20
[ROUTINE CONFIG] [WORK CONFIG] [SYSTEM CONFIG] [WATCH/DEBUG] [中文显示]
Bat V Define Setup:
Max Bat V Limit: 29.0V
Over V Comeback: 27.5V
Low V Comeback : 23.0V
Low V Limit : 21.0V
When Energy Is No Enough ,App Setup (LED Module Out) :
Low Energy Ambit: 24.0V
Out scale Setup : 0%
Restart Out scale : 0%
When Energy Is Low,App Setup (LED Module Out) :
High V : 23.0V
Middle V : 22.5V
Low V : 22.0V
A Fortiori V: 21.5V
Super Low V : 21.0V
Wind MPPT Control Parameter:
MPPT Close V : 6.0V
MPPT Start V : 12.0V
Com Setup:
Com Port:
Bps:
Auto
Notice:
Voltage Parameter Of The Page Is Different For 12v System/24v System/48v System Inside The Controller.
24v System--- Voltage Parameter Of The Page Equal To The Controller Parameter
12v System--- Voltage Parameter Of The Page Double The Controller Parameter
48v System--- Voltage Parameter Of The Page is Half for The Controller Parameter
For Example: The Voltage Setup 29.0V
Controller Parameter Of Inside Is 29.0V For 24v System
Controller Parameter Of Inside Is 14.5V For 12v System
Controller Parameter Of Inside Is 58.0V For 48v System
Write Config
Read Config

This page is used to set the battery charging parameters

(Parameters set for battery, which are suitable for lead-acid batteries, lithium batteries, etc.)

1、 Maximum limited voltage of battery. Default value 29.0V

When the battery voltage exceeds this parameter voltage, the controller sends a prompt message, automatically close the input charging inside the controller, starts automatic unloading program.

The maximum voltage of this parameter can be adjusted appropriately depends on different capacities of the battery groups.

In 24V system, this parameter is equal to the controller internal parameter.

In 12V system, this parameter is equal to 2 times of the controller internal parameter.

2、 Recovery voltage of battery’ s over voltage. Default value 27.5V

When the over voltage occurs, and the battery voltage is lower than this parameter voltage, the controller sends a prompt message, automatically start the input charging inside the controller, closes automatic unloading program.

The maximum voltage of this parameter can be adjusted appropriately depends on different capacities of the battery groups.

In 24V system, this parameter is equal to the controller internal parameter.

In 12V system, this parameter is equal to 2 times of the controller internal parameter.

3、 Recovery voltage of battery’ s under voltage. Default value 23.0V

When the under voltage occurs, and the battery voltage exceeds this p voltage, the controller sends a prompt message, the driver recovers wor functions recovered.

The maximum voltage of this parameter can be adjusted appropriately dep

different capacities of the battery groups.

In 24V system, this parameter is equal to the controller internal parameter.

In 12V system, this parameter is equal to 2 times of the controller internal parameter.

4、 Lowest limit voltage of battery. Default value 21.0V

When the battery voltage exceeds this parameter voltage, the controller sends a prompt message, closes all the output. Do charging under standby state.

The maximum voltage of this parameter can be adjusted appropriately depends on different capacities of the battery groups.

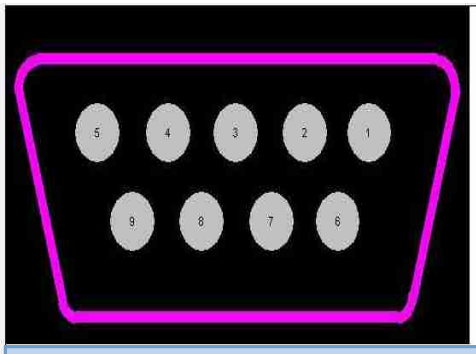
In 24V system, this parameter is equal to the controller internal parameter.

In 12V system, this parameter is equal to 2 times of the controller internal parameter.

⚠ **ormally, the non-professionals please do not do any changes to the battery parameters, otherwise, controller may not work properly, and may also cause overcharge and over-discharge to the battery, damage the battery. Here is open to customers, mainly for them who are familiar with the application and can configure internal parameters of controller much more reasonable. Achieve longer service time.**

7. Appendix: definition of communication port

The controller is configured with a standard 9-pins connector port of DB9 for communication and multi-function selection interfaces, which are defined as follows:



Definition of the pins:

1-- RXD pin (control the RXD pin) of 232 communication TTL level

2 -- TXD pin (control the TXD pin) of 232 communication TTL level

3 -- GND pin of 232 communications

4 -- TB pin of 485 communications

5 -- TA pin of 485 communications

6 -- External output power supply VCC, Voltage: 5Vdc, the maximum current: 50mA

7 -- External output power supply V+, Voltage: battery voltage

8 -- External photosensitive probe (photosensitive resistor) terminal 1 (do not rely on PV panel to detect the lighting)

9 -- External photosensitive probe (photosensitive resistor) terminal 2 (do not rely on PV panel to detect the lighting)

Above function definitions relies on corresponding hardware, in the normal communication, only pin1, 2, 3, 6 are available.

8. Quality assurance and after-sales service

One year warranty from the date of the products sold. Within the warranty period, the product failures caused by normal use, our company will provide free repair or replacement. If the warranty period has expired, our company still provides maintenance services, but requires a fee.

The product warranty is only available to the original purchaser, and it is not transferable.

Our company reserves the right to change products, product updates without notice.

One of the following conditions occurs within the warranty period, our company will not provide free services:

- Do not operate in accordance with the user manual, and caused damages.
- Equipment damage caused irresistible natural disasters.
- Customers reshape and modify the equipment.
- Customer has signed, equipment damage caused by transportation.